

The above described method of monitoring buffers in line cards should not to be considered prior art to the claims herein. Substantial problems exist with the above-described method of monitoring buffers in line cards. One problem relates to the delay period between the time when formatter 152 detects that the quantity of data in buffer 150 exceeds the single threshold value and the time when switching fabric 102 stops transmitting data in response to receiving the stop transmit control code. During this delay period, switching fabric continues to transmit data at the full rate for storage in buffer 150. If the single threshold value is not set low enough, then a risk exists that buffer 150 may completely fill resulting in the loss of some of the data transmitted during the delay period. To avoid this, the single threshold value is set relatively low, or, if the single threshold value is not set relatively low, the size of the buffer is increased. Either solution to the problem results in an inefficient use of buffer memory.

Another problem relates to the initial setting of the full rate at which data is transmitted over fabric interface 128 to line card 104. The full rate is a setting that must be guessed. A guess too high may lead to frequent generation of stop/start transmit control codes, while a guess too low may lead to an underutilization of the available data transmission bandwidth between switching fabric 102 and line card 104.

SUMMARY OF THE INVENTION

Disclosed is a method and apparatus for adapting bandwidth utilization over fabric links. In one embodiment of the method, a transmitting device transmits data at a first non-zero rate to a memory for storage therein during a first period of time. The transmitting device then
5 transmits data at a second non-zero rate to the memory for storage therein during a second period of time. The second period of time is subsequent to the first period of time, and the second non-zero rate is greater than or less than the first non-zero rate. This method may find application in switching network where the transmitting device is contained in a switching fabric, the memory is a FIFO buffer contained in a line card coupled to the switching fabric via a data link, and
10 where the transmitter transmits data via the data link to the FIFO buffer for storage therein.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be better understood, and its numerous objects, features and advantages made apparent to those skilled in the art by referencing the accompanying drawings. The use of the same reference number throughout the figures designates a like or similar
15 element.

Figure 1a illustrates, in block diagram form, an exemplary local switching network;

Figure 1b illustrates, in block diagram form, an exemplary line card employed in the local switching network of Figure 1a;

Figure 2a illustrates, in block diagram form, an exemplary local switching network
20 employing the present invention;

Figure 2b illustrates, in block diagram form, an exemplary line card employed in the local switching network of Figure 2a;

Figure 2c illustrates, in block diagram form, an exemplary line card employable in the local switching network of Figure 1a;

Figure 3 illustrates, in block diagram form, an exemplary formatter employed in the line card of Figure 2a;

Figure 4 is a flow chart illustrating operational aspects of the formatter shown in Figure 3, and;

5 Figure 5 illustrates a programmable memory for storing transmit rate values $R(1)$ through $R(n)$.

While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail, it should be understood, however, that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present invention as defined by the appended claims.

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